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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/674,883	09/30/2003	Ronald John Kuse	42.P16002	9226

7590 03/20/2007
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EXAMINER

GHYKA, ALEXANDER G

ART UNIT	PAPER NUMBER
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2812

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/674,883	Applicant(s) KUSE, RONALD JOHN	
	Examiner Alexander G. Ghyska	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 25-38 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 25-38 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

ALEXANDER GHYKA
PRIMARY EXAMINER

Av 2812
Alex Ghyska

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claims 1-5 and 25-38 are under consideration.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Gates et al (US 6,203,613).

The present Claims generally require a method comprising establishing a first atomic layer deposition conditions for depositing a film on a substrate; growing at least one monolayer of the film using the first ALD conditions, the first monolayer having first properties; establishing subsequent ALD conditions for depositing the film; and growing at least one subsequent monolayer of the film on the first monolayers using the subsequent ALD conditions.

With respect to Claim 1, Gates et al discloses an atomic layer deposition with nitrate containing precursors. Gates et al disclose establishing a first atomic layer deposition conditions for depositing a film on a substrate; growing at least one monolayer of the film using the first ALD conditions, the first monolayer having first properties. See column 9, lines 55-65 which disclose an ALD process of depositing silicon oxide. Moreover, Gates et al disclose establishing subsequent ALD conditions for

depositing the film; and growing at least one subsequent monolayer of the film on the first monolayers using the subsequent ALD conditions. See column 10, lines 5-20 where hafnium oxide is grown. With respect to Claims 2-3, the silicon oxide oxide is deposited at 350 degrees Celcius, and the hafnium oxide is deposited at 300 degrees Celcius. See Example 4, columns 9-10. With respect to Claim 4, both reactants have a first flow rate. See columns 9-10, example 4.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5 and 25-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gates et al as applied to claims 1-4 above, and further in view of Sandhu et al (US 2002/0195056), Liu et al (US 2005/0016956) and Chang et al (US 2002/0144786).

Gates et al is relied upon as discussed above.

However, Gates et al does not disclose varying the flow rates of the reactants, purge gas flow rates, pressures, and/or number of cycles as required by Claims 5 and 25-37.

Sandhu et al disclose a versatile atomic layer apparatus which comprises multiple deposition regions in which individual monolayer species are deposited under different processing conditions in each region. See page 2, paragraph 26 and Figures 3-

5. Sandhu et al discloses varying the temperature between the regions. See column 3, paragraph 33 and page 4, paragraph 47. Sandhu et al disclose varying the number of cycles. See page 5, paragraph 54.

Liu et al disclose an ALD process where the reactant flows and the purge flows are varied. See page 3, paragraph 32, page 4, paragraphs 44-46 and page 5, paragraph 47-48.

Chang et al disclose varying the pressure for various steps in an atomic layer deposition sequence. See page 5, paragraph 111.

It would have been obvious for one of ordinary skill in the art, at the time of the invention, to vary the reaction parameters of Gates et al, as disclosed by the Sandhu et al, Liu et al and Chang references, for their benefit in optimizing the atomic layer deposition process. All of the references show the variation of some of the reaction parameters. As all of the references are drawn to atomic layer deposition, a *prima facie* case of obviousness is established. Moreover, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. See *Allen et al v. Coe*, 57 USPQ 136. Furthermore, the discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. See *In re Aller*, 105 USPQ 233 (1955) and *In re Antonie*, 195 USPQ 6 (CCPA 1977). In the present case varying the reaction parameters would be a matter of optimization, which is within the skill of one of ordinary skill in the art.

With respect to Claims 33-38, it would be obvious to one of ordinary skill in the art that varying the reaction parameters would vary the properties of the subsequent layers, as different reaction parameters would vary the properties of the subsequent layers.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander G. Ghyka whose telephone number is (571) 272-1669. The examiner can normally be reached on Monday through Friday during general business hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2812

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AGG

March 14, 2007

ALEXANDER GHYKA
PRIMARY EXAMINER

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